General Mathematics Unit 3 & 4 — Examination 1 (Practice 2) — Answers & Explanations

Answers to the 20 questions in the free preview.

Data analysis

1. C. numerical and discrete

The number of siblings is a count, so it is numerical, and it can only take whole-number values, so it is discrete. "Ordinal" describes categorical data with a natural order.

2. B. 33

With 16 values the median is the mean of the 8th and 9th values in order, which are 32 and 34. The median is (32 + 34)/2 = 33. 34 is the mode.

3. A. The median for group A is greater than the upper quartile for group B.

The median for group A is 63, above group B's upper quartile of 61. The IQRs are 15 (A) and 13 (B); the ranges are 42 (A) and 58 (B, including the outlier at 88); only a quarter of group B scored above 61; and group A has no outlier.

4. B. 81.5%

18.5 hours is one standard deviation below the mean and 23 hours is two above. The percentage is 34% (from −1 to 0) plus 47.5% (from 0 to 2), which is 81.5%.

5. D. 81.4

Ana's English standardised score is (78 − 70)/5 = 1.6. The same score in Mathematics is 75 + 1.6 × 4 = 81.4. 83 wrongly adds the raw difference of 8 marks.

6. C. 25%

The percentage is taken within the under-25 column: 20 out of 80, which is 25%. 83.3% (20 out of 24) is the percentage of cyclists who are under 25, and 11.1% divides by all 180 people.

7. A. −0.8

$r^2 = 0.64$, so $r = \pm 0.8$. The negative slope means the association is negative, so $r = -0.8$.

8. D. y = 20 + 1.5x

Slope $b = r \times s_y/s_x = 0.75 \times 8/4 = 1.5$. Intercept $a = \bar{y} - b\,\bar{x} = 50 - 1.5 \times 20 = 20$. $y = 42.5 + 0.375x$ has the standard deviations the wrong way round.

9. E. On average, rent decreases by $12.50 per week for each additional kilometre from the city centre.

The slope is −12.5 dollars per kilometre: on average, each additional kilometre is associated with $12.50 less rent per week. A least squares line describes an average, not every apartment.

10. E. extrapolation

Predicting outside the range of the data used to fit the line is extrapolation, and such predictions may be unreliable.

11. D. x^2

For data that curve upwards as x increases, stretching the x-axis with an x^2 transformation (or compressing y with log(y) or 1/y) straightens the pattern. log(x), 1/x and y^2 all bend it further.

12. A. 6.6

$\log_{10}(1000) = 3$, so $y = 4.2 + 0.8 \times 3 = 6.6$. 9.73 uses the natural logarithm, and 804.2 forgets the transformation altogether.

13. B. 14.25

The four-point averages of weeks 1–4 and weeks 2–5 are 56/4 = 14.0 and 58/4 = 14.5. Centring them on week 3 gives (14.0 + 14.5)/2 = 14.25.

14. C. typically 15% below the seasonal average

A seasonal index of 0.85 means the season typically runs at 85% of the seasonal average, which is 15% below it.

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15. E. 374.4

The fourth quarter of 2026 is t = 12. The deseasonalised forecast is 240 + 6 × 12 = 312, and reseasonalising gives 312 × 1.2 = 374.4. 260 divides by the index instead of multiplying.

16. D. an increasing trend and seasonality

The same pattern repeats every four quarters (a peak in Q2 and a low in Q4), which is seasonality, and each year's values are about 4 thousand higher than the year before, which is an increasing trend.

Recursion and financial modelling

17. C. 5612.08

$V_1 = 1.02 \times 5000 + 100 = 5200$, $V_2 = 1.02 \times 5200 + 100 = 5404$, $V_3 = 1.02 \times 5404 + 100 = 5612.08$. 5306.04 ignores the +100 and 5404.00 stops at V_2.

18. A. 8%

6800/85 000 = 0.08, which is 8%. 12.5 is the number of years until the value reaches zero.

19. D. 6.17%

Effective rate = $(1 + 0.06/12)^{12} - 1 = 1.005^{12} - 1 \approx 0.0617$, which is 6.17%. 6.09% and 6.14% are the effective rates for half-yearly and quarterly compounding.

20. E. 18

The quarterly rate is 1.05%. After 17 quarters the value is $10\,000 \times 1.0105^{17} \approx \$11\,943$, and after 18 quarters it is about $12 069, so 18 quarters are needed.

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PREVIEW

That’s the end of the preview answers

These are the answers to the 20 preview questions. The full answer key covers all 40 questions in General Mathematics Unit 3 & 4 — Examination 1 (Practice 2), with the working behind every mark.

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